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38. 自 2013 年至 2020 年台灣荷蘭牛群 Freemartin 之基因診斷結果

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雄相雌性體 (freemartin) 是一種具有雄性化行為與無功能卵巢之無生育能力的雌性哺乳動物。在異性雙胞胎 (龍鳳胎) 的女牛通常會發生生殖器發育不全且發育出雄性生殖構造的現象, 導致成長後無繁殖能力。從遺傳學來看, 該動物是嵌合體, 其細胞樣本的核型 (karyotype) 顯示為 XX/XY 染色體。應用牛性別遺傳標記檢測自 2013 年至 2020 年 23 家乳牛場送檢 50 個龍鳳胎的女牛血樣, 檢測結果有 18% (9/50) 的女牛為正常的 XX 型染色體, 有 82% (41/50) 的女牛為異常的 XX/XY 型染色體。女牛是否為雄相雌性體困擾存在多時, 尤其在產期調節的同期化發情技術使用下, 會增加龍鳳胎的機率, 酪農戶選留龍鳳胎的女牛是否為不育的雄相雌性體個體更形重要。行政院農業委員會畜產試驗所提供女牛雄相雌性體檢測平台, 可檢測女牛是否為雄相雌性體, 應用此基因診斷技術, 可降低女牛育成費用與增加優質女牛選留率。

關鍵語: 牛、雄相雌性體、基因診斷

The freemartin genetic diagnosis results of Holstein herds from 2013 to 2020 in Taiwan

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The freemartin is a sterile female mammal with masculinized behavior and non-functional ovaries. Heifer of heterosexual twins usually suffer from incomplete genital development, resulting infertility after growth. The freemartin is a mosaic, and the karyotype of its cell sample is shown as XX/XY chromosome. From 2013 to 2020, fifty heifer blood samples of heterosexual twins from 23 dairy farms were detected for genetic diagnosis by genetic markers. The results showed that 18% (9/50) of heifers had normal XX type chromosomes, and 82% (41/50) of the heifers had abnormal XX/XY type chromosomes. Using the synchronizing estrus technology for reproductive regulation will increase the chance of heterosexual twins. Whether the heifers selected by dairy farmers are sterile freemartin is more and more important. Livestock Research Institute of COA provides a freemartin detection platform, which can detect whether a heifer is a freemartin. The application of the genetic diagnosis technology can reduce the cost of dairy cattle breeding and increase the retention rate of high-quality heifers.

Key Words: Cattle, Freemartin, Genetic diagnosis

41. 畜試土雞 L7 品系母雞之高產蛋數選育

41. 畜試土雞 L7 品系母雞之高產蛋數選育

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產蛋數不僅是商業蛋雞的重要經濟性狀，對於種雞與商業肉雞生產業者更是直接影響經濟效益的重要性狀。應用近親土雞台畜一號品系 L7 族群進行高產蛋數選育，依據雞隻個體 16 週齡體重、母雞 40 週齡產蛋數及種雞受精率與孵化率進行種雞選留與繁殖更新世代。經 5 個世代選育後，公雞與母雞 16 週齡平均體重有明顯上升 (P

關鍵語：雞、產蛋數、選育

Selection of high egg production in LRI-L7 native chicken

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Egg production is not only an important economic trait of commercial layers, but also an important trait that directly affects economic benefits for breeder and commercial broiler producers. The LRI-L7 native chickens were selected for high egg production. Chickens were selected based on the body weight of the individual chickens at 16 weeks of age (BW16), egg numbers produced by the hens up to 40 weeks of age (EN40), and the fertilization rate and hatchability of parents for breeding newer generations. After five generations of selection, the average 16-week-old body weight of roosters and hens were increased significantly (P

Key Words: Chicken, High egg production, Selection

43. 即時聚合酶鏈鎖反應檢測雞隻 OCX-32 基因點突變初探

43. 即時聚合酶鏈鎖反應檢測雞隻 OCX-32 基因點突變初探

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種雞蛋殼厚度 (eggshell thickness, EST) 與種蛋孵化率 (hatchability, %) 呈顯著正相關 ($r = 0.30$, P

關鍵語：Ovocalycin-32 基因、雞、蛋殼厚度、孵化率、即時聚合酶鏈鎖反應

Preliminary study on Genotypic analysis of single nucleotide polymorphism on OCX-32 gene in chicken by real-time PCR platform

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Eggshell quality has a significantly positive correlation with hatchability ($r = 0.30$, P

Key Words: Ovocalyxin-32 gene, Chicken, Eggshell thickness, Hatchability, Real-time PCR

44. 土雞 A-FABP 基因雙突變點基因型與肉質性狀關聯性分析

44. 土雞 A-FABP 基因雙突變點基因型與肉質性狀關聯性分析

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脂肪細胞脂肪酸結合蛋白 (adipocyte fatty acid binding protein, A-FABP) 基因被視為影響雞胸肉與腿肉肌內脂肪含量候選基因之一。本研究以即時聚合酶鏈鎖反應平台建置 A-FABP 基因 C85T 與 A1765G 突變點基因型鑑定，結合 240 隻試驗雞群（包括紅羽土雞、黑羽土雞及烏骨雞，各 80 隻，公母各半）肉質性狀記錄，應用 SAS 統計分析軟體進行一般線性模式 (general liner model, GLM) 與最小平方均值 (least squares means, LSM) 比較。校正品種、性別及週齡等各因子所得 BB 基因型 (A-FABP -C85T 突變點) 雞隻有顯著較高腿肉粗脂肪含量 ($5.84 \pm 0.47\%$, P 關鍵語：A-FABP 基因、雞、肌內脂肪、肉質性狀、即時聚合酶鏈鎖反應

Association analysis between genotypes of A-FABP point mutation and meat quality traits in indigenous chicken

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The adipocyte fatty acid binding protein gene, A-FABP, is considered as one of the candidate genes affecting the intramuscular fat, IMF, content in chicken. This study utilized the two-point mutation, C85T and A1765G, on the A-FABP gene by real-time PCR platform, and meat quality traits recorded from three different breeds of chicken include red feather native chicken, black feather native chicken, and silkie bantam. Strategic Application Software were performed using the general linear model (GLM) procedure of SAS to determine the significance of the effects and their interactions. The results illustrated that chicken inheriting the homozygote of BB genotype by A-FABP -C85T had a significantly higher content of IMF in the thigh muscle ($5.84 \pm 0.47\%$, P

Key Words: A-FABP gene, Chicken, Intramuscular fat, Meat quality traits, Real-time PCR

101. 黑豬 MC4R 與 GH 基因型頻率

101. 黑豬 MC4R 與 GH 基因型頻率

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本試驗目的建立黑豬生長遺傳標記 (MC4R 與 GH) 聚合酶鏈式反應檢測條件與分析其基因型頻率。試驗收集本所高雄種畜繁殖場高畜黑豬與高畜黑豬-高肉質品系豬隻共 66 頭, 收集標的豬隻以 60 - 70 日齡保育豬隻, 同胎體重最高與最低體重落差, 所收集的豬隻體重介於 6.9 ~ 25.1 kg 之間。分析黑色素皮質素受體 4 (Melanocortin 4 receptor, MC4R) 與生長激素 (growth hormone, GH) 基因型, MC4R 共分成 3 種基因型, 分別是 11、12 與 22 等 3 種基因型, 各基因型頻率分別為 60.61%、27.27% 與 12.12%; GH 共分為 3 種基因型, 分別是 D1D1、D1D2 與 D2D2 等 3 種基因型, 各基因型頻率分別為 16.67%、50% 與 33.33%。出生體重以 MC4R-12 型 1.41 ± 0.05 與 GH-D1D1 型 1.41 ± 0.09 公斤最重; 70 天體重以 MC4R-11 型 15.12 ± 0.69 與 GH-D1D1 型 15.54 ± 1.34 公斤最重。建議 MC4R 選 11 型, GH 選 D1D1 型作為選拔參考。

關鍵語: 黑豬、MC4R 基因、GH 基因

The genotype frequency of MC4R and GH genes in black pigs

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The purpose of this experiment is to establish the detection conditions of polymerase chain reaction for growth performance genes of black pigs such as MC4R and GH, and to analyze their genotype frequencies. Total 66 weaner pigs from the KHAPS black pig and KHAPS black pig-high meat quality genotype line were involved in this experiment. The samples were collected from the 60 to 70 days old weaner pigs that body weights were between 6.9 to 25.1 kg. In addition, the genotypes of Melanocortin 4 receptor (MC4R) and growth hormone (GH) were analyzed. MC4R demonstrated 3 different genotypes that named 11, 12, and 22, as well as the genotype frequencies, which showed 60.61%, 27.27%, and 12.12% respectively. Similarly, GH also has 3 genotypes, and named D1D1, D1D2 and D2D2. The genotype frequencies of GH were 16.67%, 50.00% and, 33.33%. The results show that the MC4R-12 and GH-D1D1 types indicate the highest birth weights that are 1.41 ± 0.05 and 1.41 ± 0.09 kg. Furthermore, in the 70-day old weaner pigs, MC4R-11 and GH-D1D1 genotypes show the highest body weights and are 15.12 ± 0.69 and 15.54 ± 1.34 kg respectively. In conclusion, we recommend that take type 11 of MC4R and type D1D1 of GH into the considerations of selection for breeding.

Key Words: Black pig, MC4R gene, GH gene

115. 臺灣登錄山羊微衛星遺傳標記基因多樣性分析

115. 臺灣登錄山羊微衛星遺傳標記基因多樣性分析

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本研究將藉由微衛星遺傳標記了解目前臺灣登錄山羊族群的基因多樣性，首先以南部 某羊場登錄種羊為標的，其在養登錄山羊包括台灣黑山羊恆春品系 74 頭、墾丁山羊 36 頭、波爾山羊 23 頭、努比亞山羊 39 頭及阿爾拜因山羊 8 頭，共 180 頭。以國際農糧組織建置之山羊微衛星標記檢測平台所提供之引子，藉由 MAF065、MCM527、TCRVB6、SRCRSP9、OarFCB48、CSRD247、SRCRSP23、INRA063、OarAE54、ILSTS005、SPS113、SRCRSP8、ILSTS087、INRABERN172、ILSTS029 與 DRBP1 等 16 個微衛星標記分析此場羊隻的遺傳多樣性。結果顯示此 16 組微衛星標記共檢測到 92 個對偶基因，平均每對偶基因座其有 5.8 個對偶基因。並且其期望異質度介於 0.234 至 0.896，平均為 0.554，觀測異質度則介於 0.145 至 0.945，平均為 0.537，多態性訊息含量介於 0.214 至 0.964，其平均為 0.620，16 組微衛星標記皆其有高多態性訊息含量 (PIC > 0.5)。

關鍵語：山羊、基因多樣性、微衛星標記

The genetic diversity analysis with microsatellite markers of Taiwan registered goats

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This study was conducted to elucidate the gene diversity of registered goats in Taiwan and start with the goat breeding farm in the south of Taiwan initially. Totally 180 heads of goats were involved in this experiment which included 74 Taiwan black goat Hengchun line, 36 Kenting goats, 23 Boer goats, 39 Nubian goats, and 8 Alpine goats. Based on the well-approved microsatellite markers from FAO, 16 markers such as MAF065, MCM527, TCRVB6, SRCRSP9, OarFCB48, CSRD247, SRCRSP23, INRA063, OarAE54, ILSTS005, SPS113, SRCRSP8, ILSTS087, INRABERN172, ILSTS029, and DRBP1 were applied to view the gene diversity of goats on this farm. The results showed that the average values of expected heterozygosity were 0.234 to 0.896 and had a mean value of 0.554. Meanwhile, the averages of observed heterozygosity ranged from 0.145 to 0.945 and had a mean value of 0.537. The polymorphic information content (PIC) was estimated with a mean of 0.620 and ranged from 0.214 to 0.964. All 16 microsatellite markers were highly informative (PIC > 0.5).

Key Words: Goat, Genetic diversity, Microsatellite makers

116. 種豬場產精性能耐熱型公豬檢定評選之研究

116. 種豬場產精性能耐熱型公豬檢定評選之研究

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由於熱季時因高溫與高濕度對公豬造成熱緊迫影響，導致精液品質出現降低情形，及如何確保公豬群每日生產精子之穩定性並解決全年供給品質穩定之公豬精液為豬隻育種計畫的重要基石，本試驗目的乃藉由檢定公豬涼熱季之精液品質，評選涼熱季期間仍然保有一定水平的精液質與量之公豬，作為氣候變遷熱逆境環境下產精性能耐熱適應力佳種公豬檢定新方法之產業應用。精液初步檢測濃度及活力後，樣品上機分析該樣品之活/死精子數、穿孔體及精子膜完整性、線粒體膜電位完整性與細胞凋亡比例、DNA染色質結構完整性及精子細胞內自由基等分析後，進行比較涼季與熱季各項精子品質參數。將各種豬群涼季與熱季所得之平均值相減後，初步結果顯示在杜洛克品種活力下降 8.9%、頭帽完整性下降 5%、氧化受損程度增加 1.1%；藍瑞斯品種為活力下降 15.4%、活率下降 6.8%、頭帽完整性下降 6.3%、氧化受損程度增加 1.4% 及約克夏品種為活力下降 2.7%、氧化受損程度增加 1.7%，說明熱季期間主要影響公豬精子品質參數為活力、活率、頭帽完整性及氧化受損等項目，綜合上述結果顯示，若能將種公豬熱季期間產精性能檢定新技術導入現代種畜禽選種之架構，引導種畜禽場培育動物以對氣候逆境（通常是熱和乾旱）的適應力及提高其耐逆境產能將其重要意義。

關鍵語：公豬、耐熱、精子品質、檢定

Testing of semen quality and heat-TOLERANCE of boar

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Hot season caused boar semen quality decrease. Therefore, ensuring the daily semen production and year-round, stable production of boar semen with superior quality become the basis for a successful reproduction scheme in pig breeding programs. The purpose of this study was to develop an evaluation and testing system of sperm quality traits for selection standards during hot season. The results showed that sperm membrane integrity, intact acrosome, oxidation degree in the Duroc, Landrace and Yorkshire pig of were decrease. Above all, the new technology of production performance verification during the breeding season can be introduced into the modern breeding system, it will be benefit to guide breeding animals to adapt to climate adversity (usually heat and drought) and improve their climate tolerance capacity.

Key Words: Boar, Heat-tolerance, Sperm quality, Testing

121. 近親土雞 LRI-L7 品率母雞產蛋性狀遺傳參數估計

121. 近親土雞 LRI-L7 品率母雞產蛋性狀遺傳參數估計

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本研究旨在估計近親品系土雞 L7 品系母雞產蛋性狀之遺傳參數，並探討產蛋數直接選拔對產蛋相關性能之影響。應用近親土雞台畜一號品系 LRI-L7 族群進行高產蛋數選育，依母雞 16 週齡體重、40 週齡產蛋數 (EN40) 及種雞受精率與孵化率進行種雞選留與世代更新繁殖。經五個世代選育後，依系譜與相關產蛋性能資料利用 VCE 6.0.2 軟體進行母雞產蛋性狀遺傳參數估計。結果顯示畜試土雞 L7 品系母雞初產日齡 (AFE)、初產體重 (BWFE)、初產蛋重 (EWFE)、40 週齡體重 (BW40)、40 週齡平均蛋重 (EW40) 及 EN40 之遺傳率估值分別為 0.46、0.54、0.20、0.49、0.61 及 0.42；EN40 與 AFE 其遺傳負相關 ($r_g = -0.58$)，EW40 與 BWFE 呈現遺傳正相關 ($r_g = 0.79$)、EW40 與 BW40 呈現遺傳正相關 ($r_g = 0.63$)，BWFE 與 BW40 呈現遺傳正相關 ($r_g = 0.76$)。

關鍵語：產蛋性能、遺傳參數、近親土雞

Estimation of genetic parameters for laying production traits in inbred native chicken LRI-L7 strain

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The aims of this study were to estimate the genetic parameters of egg laying traits in native chicken inbred line L7, and to explore the impact of direct selection on laying egg number on laying-related performances. Four traits selection was conducted for five generations based on hen's 16-week-old body weight, 40-week-old egg number (EN40), fertilization rate, and hatchability. The derivative-free restricted maximum likelihood procedure described by Groeneveld et al. (VCE 6.0, 2010) was used to estimate the variance-covariance components and thus genetic parameters, heritability and correlation. Results showed that the heritability estimates of age (AFE), body weight (BWFE), and egg weight at first egg (EWFE), body weight at 40-week-old (BW40), average egg weight at 40-week-old (EW40), and EN40 were 0.46, 0.54, 0.20, 0.49, 0.61, and 0.42, respectively. AFE was negatively correlated with EN40 ($r_g = -0.58$). However, high positive genetic correlation coefficients were observed between EW40 with BWFE ($r_g = 0.79$) and BW40 ($r_g = 0.63$). Furthermore, the genetic correlation between BWFE and BW40 was high ($r_g = 0.76$). It can be concluded that AFE and BWFE of hen are potential traits, which should be given consideration in implementation of selection programmed for long term selected layer population.

Key Words: Egg production, Genetic parameters, Inbred chicken

221. 台灣檸檬皮渣有效成分調查及肉豬之飼養效果

221. 台灣香檬皮渣有效成分調查及肉豬之飼養效果

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本研究於 2018-2020 年期間，調查其保健潛力的台灣香檬之有效成分，並利用生長肉豬進行飼養試驗。48 頭 LYD 生長肥育期肉豬逢機分配至三個試驗飼糧處理組，處理組 1 為對照組（生長豬基礎飼糧，CP 17%，ME 3200 kcal/kg）；處理組 2 為對照組再添加香檬粉 0.15%；處理組 3 為對照組再添加香檬粉 0.30%。豬隻採用個別飼養（每組公母各半），飼料與飲水任食，試驗為期 12 週（自 45 公斤開始，達 110 kg 時結束）。試驗結果顯示，香檬粉有效成分之桔皮素（Hesperidin）平均含量為 6,130 \pm g/g、川陳皮素（Nobiletin）為 5,053 \pm g/g、桔皮素（Tangeretin）則為 1,584 \pm g/g。試驗期間各組之平均採食量分別為 2.47、2.41 與 2.44 kg；平均日增重分別為 0.84、0.80 與 0.80 kg；飼料效率（G/F）分別為 0.34、0.33 與 0.33。在屠體性狀方面，屠宰率分別為 86.7、86.6 與 86.3%。在生長與屠體性狀均無顯著差異，但添加香檬組可顯著降低糞便 H₂S 與 NH₃ 濃度。

關鍵語：台灣香檬、生長豬、生長性能、屠體性狀

The active ingredients survey of Hiram lemon peel and feeding test of growing pigs

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During 2018-2020, the study investigated the active ingredients of Hiram lemon peel (HL), and a feeding test of growing pigs was finished. Forty-eight LYD growing pigs were randomly allotted to three dietary treatments, including Treatment 1: the basal diet (CP 17%, ME 3200 kcal/kg) based on corn-soybean meal; Treatment 2: basal diet supplementing 0.15% HL; Treatment 3: basal diet supplementing 0.3% HL. Each Pigs were fed individually for 12 weeks. Results showed the active ingredients hesperidin was 6130 \pm g/g, nobiletin was 5053 \pm g/g, and tangeretin was 1584 \pm g/g. The average feed intake were 2.47, 2.41 and 2.44 kg; the average daily gains were 0.84, 0.80 and 0.80 kg; feed efficiency (G/F) was 0.34, 0.33 and 0.33, respectively. The slaughter rates were 86.7, 86.6, and 86.3%. There was no significant difference in growth performance and slaughter traits among treatments, but the stool H₂S and NH₃ conc. in treatments supplemented HL powder were reduced significantly.

Key Words: Hiram lemon,, Growing pigs, Growth performance, Slaughter traits